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Evolution of Training on Network Visualization Tools

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Abstract:

With the exponential increase in data, researchers have a need for resources that can analyze such data. The number of resources that have been developed for analyses of these data can be overwhelming to researchers. A collaboration between librarians and the biomedical community can help streamline the process of choosing a resource. Bioinformationists can help biomedical researchers by learning about resources, providing recommendations, and teaching researchers how to use them. This poster discusses the evolution of two bioinformationists' teaching experiences of two molecular network visualization tools, Cytoscape and VisANT. The training audience begins with researchers in small training classes but ultimately evolves to include other librarians who can bring that knowledge back to their own institutions and researchers. This evolution shows the increasing role of librarians in the field of biomedical informatics.

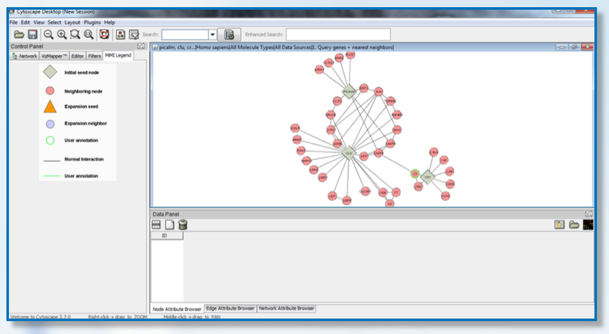
Introduction:

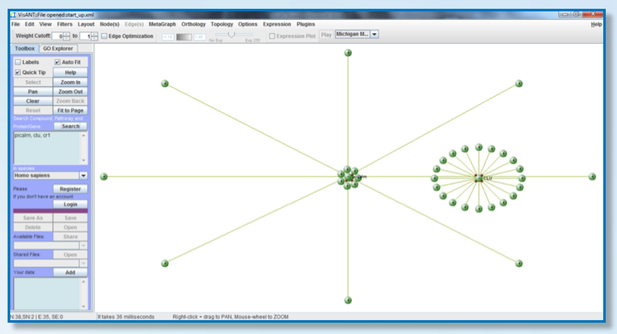
With the dramatic increase in the number of databases, data sets, tools, and software being used to store, retrieve, and analyze proteomic, genomic, and metabolomic data, there is an increasing need for someone to make sense of it all. This is an area where the bioinformationist can help the biomedical informatics community by learning about such resources, providing instruction on their use, and imparting the knowledge of how they differ from each other. Bioinformationists are "information specialists who have received graduate training and practical experience that provides them with disciplinary background both in biomedical, behavioral or biological sciences and information sciences/informatics" as defined by the National Library of Medicine (NLM).[1]

Over a period of time, two bioinformationists have increased their knowledge of network visualization tools and expanded their training audience. What started as teaching Cytoscape to their institution's researchers has eventually turned into teaching Cytoscape and VisANT to other librarians. This evolution shows the ever increasing importance of the role of librarians in the field of biomedical informatics.

Cytoscape and VisANT:

Cytoscape (http://cytoscape.org/) and VisANT (http://visant.bu.edu/) were both chosen because they are free, open source software tools used to visualize and analyze biological networks and pathways. We feel it is important for librarians to know about such visualization tools and to be able to explain the differences between them to their researchers.





Feature	Feature Specifies	VisANT	Cytoscape
Availability	Free for academic use	Yes	Yes
	Open source	Yes	Yes
Command Line Interface	Batch mode	Yes	Yes (Limited; not available for all plugins)
Database	Association with a database	Yes	No (Not as a standard feature; Yes with additional plugin eg. MiMI)
	Customizable gene/protein interaction database	Yes	No
User Interface	Java (standalone client)	Yes	Yes
	Web-based	Yes	No
Plugins	Plugin development	Yes	Yes
	Plugin distribution and management over the internet	No	Yes
User Controlled Features	Ability to create/import user Defined networks/pathways	Yes	Yes
	Use of Metanodes	Yes	No (Not as a standard feature; Yes with Metanodes plugin
	User defined node and edge attributes	No	Yes
Usability	Ease of use	High	Low

Stage 1: Training Classes

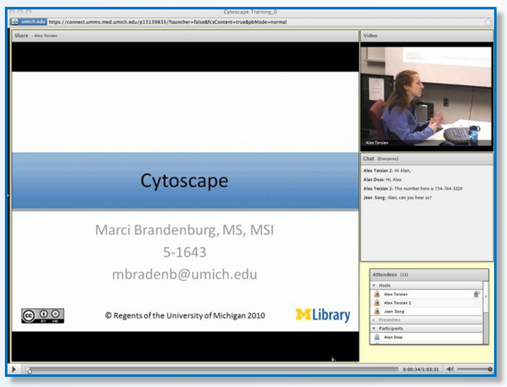
Two bioinformationists individually taught Cytoscape at two locations: University of Michigan and National Cancer Institute-Frederick. Each librarian periodically held training sessions for their researchers, introducing them to Cytoscape and showing them several plugins. With each session, the bioinformationists learned more about researchers' needs and interests regarding visualization tools. These trainings were popular, having a total attendance of 44 people at NCI-Frederick (over 6 course offerings) and 52 at University of Michigan (over 4 course offerings). The success of these classes proved the need for such trainings, and made the bioinformationists feel that they should expand their audience.

Stage 2: Cytoscape Annual Retreat

The two bioinformationists collaborated to give a presentation and poster at the Cytoscape annual retreat in July 2010. This provided an opportunity for the Cytoscape community to learn that librarians are training on Cytoscape. In addition, the librarians were able to provide feedback from their training sessions, which included some potential changes and improvements to the software. The Cytoscape developers were extremely interested in this feedback. As a result of this presentation, the bioinformationists realized that they had a real opportunity to show what librarians can do in the field of biomedical informatics.

Stage 3: Remote Cytoscape Training Class

In March 2011, the bioinformationists at the University of Michigan held a remote Cytoscape class, using Adobe Connect. 30 people viewed this session; participants included not only people from the University of Michigan, but also North Carolina Central University, Jackson State University, University of Illinois, the National Cancer Institute-Frederick, and Plutonic Research and Knowledge Teams Intl. Using this type of remote venue for teaching the Cytoscape class permitted the bioinformationists to expand their reach beyond local institutions and to the larger biomedical community.



Stage 4: Training the Trainer

In the future, the Librarians will be teaching a Continuing Education course, focusing on Cytoscape and VisANT. This course will teach librarians about Cytoscape and VisANT so that they can suggest and teach this resource to their researchers. The bioinformationists felt that it is important for librarians to know about multiple visualization tools, leading to the inclusion of VisANT for this training, in addition to a discussion of criteria to explore when investigating these types of tools for use. This course expands the reach of these two bioinformationists, so that their training audience now includes other librarians too. The result of this course will be to expand the role of librarians within the field of biomedical informatics, allowing more librarians to provide improved support to their biomedical researchers.

Conclusion:

Relationships can be developed between libraries and biomedical informatics researchers, saving the researchers time, energy, and frustration. Bioinformationists can take on the responsibility of learning about and teaching about the functionality of informatics tools, such as Cytoscape and VisANT, thereby, freeing time for the researchers, themselves. This time savings allows researchers to focus on their own data and analysis, rather than on trying to understand the various resources available to them. Bioinformationists can provide useful information to researchers, developers, and librarians in the field of biomedical informatics.

In the future, these bioinformationists intend to continue offering classes on Cytoscape, VisANT, and other biomedical informatics resources. They intend to further expand their reach, continue to train in a variety of environments, and expect to see continued evolution in their training on network visualization tools.

References:

1 NLM Individual Fellowship for Informationist Training (F37) (PAR 06-509). http://grants.nih.gov/grants/guide/pa-files/PAR-06-509.html